

CLAIMS

1. A system for tracking the position of an instrument relative to an area of interest, comprising:

an instrument;

an instrument guide mounted to said instrument, said instrument guide carrying a first localizer proximate said instrument, said first localizer being movable relative to said instrument; and

a fixator configured to be attached to the area of interest, said fixator carrying a second localizer proximate said area of interest, said second localizer being movable relative to the area of interest, said first and second localizers being movable in order that said first and second localizers are in communication such that the position of one of said first and second localizers is known relative to the position of the other of said first and second localizers.

2. The system of claim 1, wherein said first localizer is an electromagnetic receiver and said second localizer is an electromagnetic transmitter, said transmitter and receiver being connected to a computer that analyzes the communications therebetween to calculate the position of said receiver relative to said transmitter.

3. The system of claim 1, further including an imaging device that takes images of the area of interest, said images being stored on a computer system that calculates the position of said second localizer on said images and calculates the position of said first localizer relative to said images.

4. The system of claim 1, wherein said instrument guide includes a handle assembly and a localizer assembly that are connected at concentric collars, said collars receiving said instrument along a longitudinal axis, said localizer assembly carrying said first localizer, said collars being rotatable relative to each other such that said first localizer is rotatable about said longitudinal axis relative to said instrument and handle assembly.

5. The system of claim 1, wherein said fixator includes a block receiving screws in channels therein, said second localizer being connected to said block and said screws being inserted into the area of interest, said block being adjustable along said screws in order to adjust the position of said second localizer relative to the area of interest.

6. The system of claim 1, wherein said fixator includes a block connected to the area of interest, said fixator further including first and second clamps and a post, said first and second clamps being adjustably connected to said block and said post being adjustably connected to said first and second clamps, said post receiving said second localizer such that said second localizer is adjustable relative to said block along said first and second clamps and said post.

7. The system of claim 1, wherein said instrument is a surgical drill guide and the area of interest is an area of a patient's body, said first and second localizers being connected to a computer carrying images of the area of interest, said computer analyzing the communication between said first and second localizers to calculate the position of said instrument relative to said images.

8. The system of claim 1, wherein said first and second localizers are light emitting diodes.

9. The system of claim 1, wherein said fixator includes a post, said post having a shaft with a spring and dowel mechanism thereon, said second localizer receiving said shaft such that said dowel engages said second localizer and said spring is loaded between said second localizer and said post to secure said second localizer to said post.

10. The system of claim 1, wherein said instrument guide includes a handle assembly connected to a first collar and a localizer assembly carrying said first localizer and being connected to a second collar, said first and second collars being connected and concentrically aligned and receiving said instrument, said first and second collars being configured to move relative to each other about said instrument.

11. The system of claim 1, wherein the position of the first localizer relative to the instrument and the position of the second localizer relative to the fixator may be adjusted such that the positions of the first and second localizers relative to each other may be adjusted to optimize communication therebetween.

12. The system of claim 1, wherein the position of the first localizer relative to the instrument and the position of the second localizer relative to the fixator may be adjusted such that the positions of the first and second localizers relative to a third localizer may be adjusted to optimize communication between the three localizers.

13. A tracking system, comprising:

a surgical instrument;

a computer system that stores an image of an area of interest of a patient's body;

an instrument guide mounted to said surgical instrument, said instrument guide including a stem configured to carry a first localizer a fixed distance from said surgical instrument, said first localizer being connected to said computer, said stem being movable relative to the rest of said instrument guide; and

a fixator connected to a bone in the area of interest, said fixator including a post configured to carry a second localizer proximate the area of interest, said second localizer being connected to said computer, said post being movable relative to the area of interest, said first and second localizers being movable in order that said first and second localizers are in communication such that said computer system calculates the position of said first localizer relative to the position of said second localizer and said image.

14. The system of claim 13, wherein said first localizer is an electromagnetic receiver and said second localizer is an electromagnetic transmitter, said computer analyzing the electromagnetic communications therebetween to calculate the position of said receiver relative to said transmitter.

15. The system of claim 13, further including an imaging device that is connected to said computer system, said imaging device taking said images of the area of interest such that said images are stored in said computer system.

16. The system of claim 13, wherein said instrument guide includes a localizer assembly including a mounting block connected to said stem, said mounting block carrying said first localizer, said stem being connected to a collar that is rotatable relative to said surgical instrument.

17. The system of claim 13, wherein said fixator includes a block receiving screws in channels thereon, said second localizer being connected to said block and said screws being inserted into the bone, said block being adjustable along said screws in order to adjust the position of said second localizer relative to the area of interest.

18. The system of claim 13, wherein said fixator includes a block connected to the bone, said fixator further including first and second clamps, said first and second clamps being adjustably connected to said block and said post being adjustably connected to said first and second clamps, said post receiving said second localizer such that said second localizer is adjustable relative to said block along said first and second clamps and said post.

19. The system of claim 13, wherein said first and second localizers are light emitting diodes.

20. The system of claim 13, wherein said fixator includes a post, said post having a shaft with a spring and dowel mechanism thereon, said second localizer receiving said shaft such that said dowel engages said second localizer and said spring is loaded between said second localizer and said post to secure said second localizer to said post.

21. The system of claim 13, wherein said instrument guide includes a handle assembly connected to a first collar and a localizer assembly carrying said first localizer and being connected to a second collar, said first and second collars being connected and

concentrically aligned and receiving said surgical instrument, said first and second collars being configured to move relative to each other about said surgical instrument.

22. The system of claim 13 wherein the position of the first localizer may be adjusted by moving the stem relative to the rest of the instrument guide and the position of the second localizer may be adjusted by moving the post relative to the bone, such that the positions of the first and second localizers relative to each other may be adjusted to optimize communication therebetween.

23. The system of claim 13 wherein the position of the first localizer may be adjusted by moving the stem relative to the rest of the instrument guide and the position of the second localizer may be adjusted by moving the post relative to the bone, such that the positions of the first and second localizers relative to a third localizer may be adjusted to optimize communication between the three localizers.

24. A method for using an electromagnetic localizing system, comprising:

taking an image of an area of interest of a patient's body and storing said image on a computer system;

providing a surgical instrument;

providing an instrument guide that is connected to said surgical instrument, said instrument guide having a localizer assembly that carries a receiver thereon, said receiver being connected to said computer, said localizer assembly being movable relative to the rest of said instrument guide;

providing a fixator that is attached to the area of interest of the patient, said fixator having a transmitter post that carries a transmitter thereon, said transmitter being connected to said computer, said post being movable relative to said area of interest; and adjusting the positions of said localizing assembly and post in order that said transmitter and said receiver, respectively, are in electromagnetic communication such that the computer system may calculate the position of said receiver relative to said transmitter and said image.